# 2022 SURF AWARD RECIPIENTS

The Office of Undergraduate Research and Creative Activities is pleased to announce the Summer Undergraduate Research with Faculty (SURF) award recipients for Summer 2022. Please join us in congratulating these students and their faculty mentors.

## Summer Undergraduate Research with Faculty (SURF)

<table>
<thead>
<tr>
<th>Student</th>
<th>Mentor</th>
<th>Major</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peyton Baxley</td>
<td>Tim Carens</td>
<td>English</td>
<td>English</td>
</tr>
<tr>
<td>Liam Brunson</td>
<td>Michael Larsen</td>
<td>Physics</td>
<td>Physics &amp; Astronomy</td>
</tr>
</tbody>
</table>

### Beautiful Women with Malicious Intent

The femme fatale, the infamous beautiful woman who seduces men to gain power over them, expresses the desperate situation of women in patriarchal culture. She is related to age-old mythological creatures who allure and destroy: vampires, sirens, mermaids, nymphs, sphinxes, etc. However, unlike these supernatural creatures, the femme fatale is a “regular” woman who must obscure her ambitions to generate trust. Her unparalleled beauty wins the trust of men, distracting them from her plots to use them as instruments of power. The femme fatale exploits men to fulfill her desire, whether it be money and social position, or love and admiration. This figure, therefore, personifies “increasing fears about the mutability of gender,” for she dethrones masculinity and seizes its place, flipping the hierarchy on its head (Braun 11). On the surface, her ploys may seem unnecessarily cruel. However, confined by her sex, the femme fatale must claw her way out of her patriarchal imprisonment. To acquire agency, she internalizes expectations of femininity and acts accordingly, ironically assuming the guise of innocent weakness. In this project, I will explore how the femme fatale plays an artificial theatrical role, performing as the paragon of feminine obedience and propriety. In doing so, she takes a devious path, escaping helplessness by pretending to be helpless. By understanding and manipulating femininity as constructed by patriarchal culture, the femme fatale imposes her power through a carefully contrived performance.

### Flash Freezing Raindrops: Generation of Synthetic rain in the Lab

Our lab has multiple instruments that measure individual raindrop features including drop size, drop shape, and drop fall speed. These instruments work in a variety of ways - some take pictures of raindrops as they fall through a sensor, others use a sensitive scale to measure the accumulated weight of liquid water in a container, and others use the sound of rain impacts to estimate drop sizes. All of these instruments need to be occasionally calibrated in order to ensure that their measurements are reliable. accurately recreates the unique properties of a rain drop to calibrate the instrument. For example, the sound made from a steel ball bearing hitting a plastic sensor is fundamentally different in volume and structure from an equally massive raindrop hitting the same surface. Some of these instruments require a liquid droplet with density, surface tension, fall speed, and size close to real rain drops to reliably calibrate the instrument. This is
surprisingly challenging to do. Raindrops are typically much smaller than most people expect, but they are not so small that commercial devices like ink-jet printer cartridges can produce them in a controlled manner. Transfer pipettes and sprinklers generate drops many times too large. Other mechanisms that DO give the proper size drops often don't produce them exactly where you want them to be. In this project, I will be characterizing and customizing a laboratory system to make raindrop sized water drops that have sizes, fall speeds, and shapes similar to natural raindrops.

Student: Terence Carey
Major: Mathematics
Mentor: Oleg Smirnov
Department: Mathematics

Localization for Rings and Categories

The idea of localization is to enhance a numerical or an algebraic content to allow division between the elements and, as a result, reciprocal quantities and fractions. The most famous example of such construction is extending integer numbers to rational fractions. This idea proved to be fruitful in many mathematical disciplines and quite notably in Algebra, Algebraic Geometry, and the Category Theory. There are many versions of localization construction in Algebra and, in particular, in Ring Theory. However there is no version which would work for rings as well as additive categories. Since every ring is an additive category such a construction is highly desirable. It would allow a uniform treatment of both localization theories as well as provide a useful connection between the Ring theory and the Category theory. The goal of our project is to fill this gap. The project will be a continuation of the wok done by the mentor for monoids and semigroups in [6].

Student: Raymond Depalma
Major: Geology
Mentor: John Chadwick
Department: Geology & Environmental Geosciences

Chemical Characteristics of Hybrid Lavas: Lassen Volcanic Province

The chemical compositions of lavas erupted from Earth's volcanoes are controlled by associated tectonic processes. Volcanoes at hotspots (like Hawaii, where deep plumes rise in the Earth's mantle), mid-ocean ridges (where new oceanic crust is made), subduction zones (where old oceanic crust descends into the mantle), and Basin and Range faulting (where a region of continental crust is pulled apart) all produce distinctive lavas with different chemical and isotopic properties, because they melt different parts of the Earth's mantle or result from different melting processes. Most volcanoes found on Earth are the result of a single tectonic process and therefore have diagnostic chemical and isotopic compositions. Lassen Volcano in Northern California is a subduction zone volcano, part of the Cascade Range that extends along the Pacific coast up to Canada, so its lavas would be expected to have chemical fingerprints typical of subduction volcanoes found around the world. But Lassen is also located in an area of continental extension known as the Basin and Range, a process which produces lavas with a different chemical composition. Previous studies of the Lassen Volcano area suggest that different magma types may be mixing to produce hybrid lavas there, a result of these two overlapping tectonic processes. In the proposed SURF research, Dr. John Chadwick and undergraduate Ray Depalma will measure key chemical elements and isotopes (of strontium, neodymium, and lead) in Lassen lava samples to understand the extent and variability of this mixing and its importance over the history of the Lassen volcanic system.
**Quantitative assessment of Antibiotic Resistant Fecal Coliforms**

Charleston is a city that survives, thrives, and excites the collective imagination for two primary reasons: a historical legacy and proximity to water. The very nature of Charleston’s coastal situation - an antebellum downtown peninsula at the intersection of two primary waterways and one of the busiest shipping harbors in the country - renders the city unique. Its surrounding environment is also tied to the water which flows ceaselessly in and out of its harbor and the two rivers which empty into it. Urban development and a system of overflow storm sewers that empty into these local waters present risks to this environment and potentially, human health. The Charleston Waterkeeper organization monitors water quality in local waterways, and tests indicate worrying levels of contamination. There is concern that some organisms in the water may possess resistance to antibiotics, the miracle of modern medicine. In fact, the Centers for Disease Control and Prevention (CDC) states that Carbapenem-Resistant Enterococci (CRE), an organism that lives in the human gut, is of “grave concern.” Thus, we propose to collect water samples at the Charleston Waterkeeper test site and conduct our own lab tests for the presence/absence of resistant organisms. We plan to plot detection of any such organisms over time and in relation to tidal status (high tide, low tide, etc). In addition, we aim to have any such organisms’ genetic composition sequenced and report these results at conferences and through scientific channels. We anticipate that this research could serve as a pilot project in advance of an external funding proposal to carry this work forward to sample for more potentially resistant organisms over a longer duration of study.

**The Experience of Bewitchment: A Psychological Exploration of Witchcraft in Early Modern England**

The prosecution and execution of thousands of people during the witch-hunts of early modern Europe was driven by the genuine fear and belief in the power of black magic and the Devil. However, witchcraft was not strictly an imagined crime. In recent years, historians have explored “the reality of witchcraft,” uncovering traces of the practice of witchcraft and the experience of bewitchment in early modern Europe. Belief in witchcraft was so strong and widespread, in part, because people, especially unprotected women, turned to witchcraft and actually practiced it. Magic is not real, yet documentation of trial and treatises from the time show a consistency in physical symptoms of people who were said to have been bewitched. Modern psychological findings may suggest a reason for the consistency in these experiences of bewitchment. Recent findings in the field of psychology reveal that physical symptoms can arise without any medical explanation. Instead, the physical symptoms are caused by the mind, especially by feelings of stress for internal conflict. The psychological findings could suggest a reason for the consistent experiences of bewitchment during the witch-hunts of early modern Europe, experiences that drove witchcraft prosecution, claiming tens of thousands of lives. Our research project will focus on early modern England because, due to judicial laws, England did not use methods of torture as frequently as other European areas, so the sources will be less tainted by torture-driven false confessions. Using psychological studies, secondary sources on both history and psychology, and primary source documents such as treatises and trial records, the project will analyze the influence of psychology in the “reality” of witchcraft.
Flash Freezing Raindrops: Ice Nucleation Experiments

This project will explore the physical, chemical, and biological variability of raindrops generated in different geographical and meteorological environments. Although rain drops are mostly water, every rain drop started as something else—either a salt crystal, bacterium, ash flake, or some other airborne particle. As these initially dry airborne particles grow into liquid cloud droplets and ultimately rain drops, these initial materials stay in the growing water droplet and can continue to influence the physics of how the drop interacts with its environment. For example, cloud droplets containing certain types of bacteria freeze at different temperatures than similarly sized drops that formed on sea salt crystals. It is expected that the composition of raindrops falling to the earth may significantly vary from drop to drop, storm to storm, or location to location—yet studies of this variability are rare. Previous work generally collected the water from many drops in a single container for bulk analysis, but this hides how much one drop’s environment may differ from another. Our lab is devoting our summer efforts to better understand raindrop to raindrop variability by flash freezing and storing individual rain drops in liquid nitrogen, then measuring each flash frozen drop in a variety of ways to learn more about their physical, chemical, and biological properties. In this part of the project, we will be taking these natural flash-frozen raindrops, allowing them to melt, and then determining which temperatures they refreeze at. By examining their freezing temperatures, we can determine information about the drop’s composition and meteorological history.

Lassen Volcano Lavas: Disequilibrium Mineralogy

When magmas rise and cool beneath volcanoes, mineral crystals form in the magma. The kinds of minerals that form are a reflection of the magma chemistry; if it is rich in iron and calcium, the minerals olivine and plagioclase will form, whereas abundant silica and potassium lead to quartz and mica formation. Lava flows from Lassen Volcano and surrounding volcanic centers in northern California have unusual mineral combinations that suggest different sources of magma are mixing below that volcanic system. In some lava flows, olivine and quartz are found in the same flow, the mineral equivalent of finding apples growing on an orange tree. Lassen Volcano formed at the southern end of the Cascade volcanic chain, which extends up the Pacific coast to Canada. This type of "arc" volcano forms as a result of subduction, where oceanic crust dives into the mantle beneath North America. Subduction volcanoes typically erupt a type of lava known as andesite, which originates in the deep mantle and has a typical suite of mineral crystals that form in it. Lassen is also very close to an area where continental crust is being pulled apart known as the Basin and Range, which extends from California into several other western States. Basin and Range faulting leads to thinning of the crust and produces another form of lava called basalt, which originates in the shallower mantle with a different suite of minerals. Our hypothesis is that both types of magma are mixing in the crust, producing the unusual mineral combinations in lava flows. This hypothesis will be tested via analysis of mineral chemistry and of small pockets of magma trapped within the crystals called melt inclusions, which can reveal the sources of the mixed magmas.
Correlation Between Arsenic in Groundwater Wells and Faults in the mid-state of North and South Carolina

The poison, inorganic arsenic, is often found in groundwater wells that supply rural residents with drinking water in the mid-state of the Carolinas. Long term exposure to high concentrations of arsenic in drinking water has been shown to lead to severe health problems from cancer to infertility. While some correlations with specific rock types have been identified, the correlation is not straightforward and has lots of inconsistencies, suggesting that another parameter may be partially responsible. We propose that large scale faults may increase the likelihood of Arsenic in groundwater because of their large deep (sometimes kilometers) fracture system that interacts with the groundwater pulled out of the wells. Our proposal is to use the geospatial program Arc-GIS to create maps of Arsenic concentrations versus known faults and to then perform statistical analyses to determine the hazard rate of increased Arsenic based on a number of variables. We will test our models by gathering more data through well sampling in the mid-state of South Carolina where there is less data available. We anticipate publishing our results through the local Geologic State Surveys and at the international GSA conference.

Assessment of Antibiotic-Resistant Indicator Organisms in Charleston's Shem Creek: A Pilot Study

In efforts to address sea-level rise and flooding threats, civil engineers often put forward plans involving built, “gray” infrastructure such as seawalls and drainage systems. However, environmental scientists tend to support nature-based solutions to these issues, often calling for “green” infrastructure making use of natural ecosystems such as salt marshes and reefs. For governing bodies, choosing the proper solution for sea-level rise has been a cause for debate and controversy. Resolving this debate certainly involves navigating the uncertainty of climate projections and responses, and the complexity of interactions between natural and artificial systems. However, it also involves something more sociological in nature: the value judgments of specific scientific explorations—decisions of what questions to ask, what parameters to include or exclude from one’s models, what observations to reject as erroneous, how to interpret and present data, and so on. These value judgments in turn can be influenced by disciplinary biases and blind spots. That is, whole disciplines tend to have distinct cultures and practices. In this project, we try to track patterns of disagreement within and between disciplines regarding the likely effectiveness of built (“gray”) infrastructure compared to natural (“green”) infrastructure in two ways. First, through developing a case study on the responses of Charleston County towards sea-level rise and coastal flooding. Second, through an interdisciplinary literature review of sea-level rise, coastal flooding, and disaster risk management. We then go on to frame ethical questions that arise from these potential clashes of disciplines for the practice of governance. This examination will include both the appropriate role of the governing bodies themselves in the face of potential disciplinary controversies and biases, and the appropriate form of judicial review of such bodies.
Effects of salinity on oviposition site choice and mate choice in squirrel treefrogs

Global climates are changing rapidly due to human causes. One symptom of this environmental change is the salinization of freshwater. For example, low lying areas such as Charleston, SC experience large amounts of flooding due to rising sea levels and increasingly severe storm surge. These sudden influxes of salt water can change the levels of salinity in freshwater habitats along the coast. Amphibians are particularly sensitive to elevated salinity due to their semi-permeable skin and their life cycle, which begins in completely aquatic environments. Despite this vulnerability, amphibians are able to make choices that can improve their own and their offspring’s success. Mate choice and choice of a habitat for egg-laying are two behaviors that can specifically impact the offspring. We propose to study the impact of freshwater salinization on mate choice and habitat choice in a common South Carolina amphibian. Female squirrel treefrogs will be collected when they are ready to mate and placed inside a sound-insulated chamber containing two separate dishes of water, each associated with a speaker that can broadcast simulated frog calls. The dishes will either contain freshwater or a solution with elevated salinity. Which dish and speaker the female approaches will reveal her ability to choose a suitable offspring habitat. We predict that female frogs will sacrifice mate quality, as indicated by features of the mating call, for improved habitat quality due to the strong impact salinity has shown to have on amphibian tadpoles. This research will improve our understanding of how environmental change can impact behaviors that help determine the success of vulnerable animal populations.

Biases in Interpretation and Memory in Young Children: Linkages to Maternal Reminiscing

In everyday life, young children and their parents frequently discuss memories of past events. A large literature demonstrates that mother-guided reminiscing fosters the development of children’s autobiographical remembering skills. Through these exchanges, young children learn how to structure and share their memories in narrative form. Children also depend on parents to help them evaluate the past. Yet very little is known about how variations in the ways that parents frame and guide conversations about earlier events may shape how children come to interpret and remember their experiences! To examine these issues, Principe and colleagues (e.g., Principe, Greenberg, Shymanski, West, & Cibischino, 2019) carried out two studies where mothers and their children reminisced about recent shared events. Later, children independently experienced a scripted event made up of a series of ambiguous social interactions. Results indicated that mothers who framed the reminiscing conversations in an emotionally negative manner had children who were especially likely to interpret the ambiguous experiences in a negative manner and misremember them in a way that that incorporated the meaning of their previous negative interpretation. The proposed study aims to replicate and extend these initial findings to determine if this relation remains in mothers who have been diagnosed with emotional disorders, such as anxiety or depression. This is an important extension because studies of adults demonstrate that negative interpretation and memory biases contribute to emotional disorders such as depression and anxiety (Hertel & Mathews, 2011), but little is known about what sorts of early experiences might contribute to the development of these cognitive biases.
**Microplastics as a possible vector for ingestion of adsorbed toxins by invertebrate larvae**

Increases in the concentration of small plastic particles ("microplastics") have become a major environmental concern worldwide. The potential for microplastics to be consumed as if they were food particles and to leach toxic chemicals into the bodies of their consumers has profound implications for the health of organisms and the way they interact in communities. Currently we lack information about plastic ingestion for many organisms, particularly during early life stages. We propose to survey microplastic ingestion in the larval stages of invertebrates collected from local marine habitats. Furthermore, plastics can adsorb other harmful chemicals from the environment, potentially worsening the effects of microplastic ingestion. Phthalates are one class of chemicals of particular concern. Added to everything from personal care products to medical devices, they can mimic estrogen and have been detected in human breast tumors. Because aquatic organisms are regularly exposed to both microplastics and phthalates, it is important to understand their potential for combined effects through ingestion of particles coated with phthalates. While we have evidence of a negative effect of phthalate exposure on sea urchin larvae, we lack information about how ingestion could worsen those effects. We therefore also propose a laboratory experiment with sea urchin larvae to test for interactive effects between microplastics and phthalates, using the growth and symmetry of the larval skeleton to detect effects on their health.

**Biases in Interpretation and Memory in Young Children: Linkages to Maternal Reminiscing**

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More than 'disease': uncovering the political, social, and economic consequences of COVID-19 in Sierra Leone

This qualitative study of community-based experiences of COVID-19 in Sierra Leone seeks to reveal community-based perceptions of the COVID-19 pandemic in the West African country of Sierra Leone. The number of COVID-19 cases have been comparably in Sierra Leone here in contrast to other countries as it has had 7,648 confirmed Covid-19 cases according to the Johns Hopkins Coronavirus Resource Center (as of February 11, 2022). However, due to strict government containment measures, Sierra Leonean individuals have suffered severe social and economic consequences. Following the Ebola epidemic in 2014-2015, and in a spirit of "never again," the Government of Sierra Leone acted swiftly to close its borders and to restrict movement between its 14 districts. It has also variously-in response to different waves of Covid-19 infection-implemented country-wide lockdowns and imposed nightly curfews for its citizens. These measures ultimately caused businesses to collapse and limited opportunities for people to earn an income, which has led to widespread food insecurity (Kavanaugh 2020). Limited lab capacities in many areas, chronically scarce personal protective equipment (PPE), and other material deprivations are all pressing issues that Sierra Leoneans have had to face in the wake of Covid-19. By interviewing participants, this study seeks to represent the "view from below" to understand the individual experiences of participants in eastern Sierra Leone during this global health pandemic (Abramowitz et al. 2015). To evaluate the success of the project, we hope that representation of these community experiences informs locally-relevant prevention activities.

Continuation of HPC Cluster Research and Development

This research project will allow the researcher to learn about Geoinformatics, the science and the technology which develops and uses information science infrastructure and software applications to address the problems of geography, cartography, geosciences, and related branches of science and engineering. The researcher will work with geo-data for better understanding and interpretation of human interaction with the earth’s surface, specifically with flooding in Charleston, SC. Citizens in the coastal South Carolina region face an ever-growing struggle with understanding when and where tidally-induced flooding is going to impact their daily routines. The coastal counties of South Carolina continue to experience significant growth in population as well as business and residential development. This research seeks to utilize an HPC cluster in order to help develop an application that will tie current and predicted gauge station tidal heights to associated inland flooding in real-time. By joining tidal data to its estimated flooding impacts in real-time, the app will allow users to identify areas that are currently and soon-to-be expected to be experiencing localized flooding.

Hydrodynamic Simulations of Exoplanet Atmospheres with Variable Stars

The study of extrasolar planets is crucial to understanding the evolution of the universe and our place in it, and determining the habitability of said planets is therefore of vital importance. To do this, a
robust profile of planet formation and evolution is necessary, especially that of a planet’s atmosphere. It is thought that M type stars, the most common type of star in our universe and therefore those most likely to be hosting planets, are highly active in their youth and produce great levels of radiation and solar winds. Such activity has the potential to disrupt or otherwise adversely affect the development of a potentially habitable planet by stripping away its atmosphere and leaving its surface unprotected to space. With the implications of such an outcome, developing a better understanding of these processes and whether such an interaction between a planet’s atmosphere and its host star would indeed render it uninhabitable is of vital importance, which is what this project seeks to do. Using the hydrodynamic modeling software known as PLUTO, this project seeks to simulate how the atmosphere of a given planet would respond to the active conditions of a star. Multiple simulations, each with varying parameters regarding the planet at the star that are being simulated, will be conducted so as to obtain a wide range of data that can be used to determine the specific conditions under which a planet may or may not be rendered uninhabitable. The resulting figures will require interpretation and much analysis in order to accomplish this, and to do so accurately. The results will then be communicated and will provide more knowledge upon which to build in future research.

Student: Casey O’Brien
Major: Biochemistry
Mentor: Katherine Mullaugh
Department: Chemistry & Biochemistry

Impact of Complexation of the Removal of Heavy Metals from Water with Magnetic Nanoparticles
The United States has identified access to clean water as one of its sustainable development goals. As water supplies continue to be strained, this goal becomes harder to achieve. Contaminated water supplies grow greater in number, and traditional water treatment methods are not able to treat micropollutants, compounds that are too low in concentration to be captured, yet are still harmful to human health. Some well-known micropollutants include lead and arsenic, both harmful enough to poison the water of entire communities. New water treatment methods must be developed to combat these micropollutants, one “green” method is the use of recyclable magnetic nanoparticles, these extremely small iron containing particles, have an optimized surface area allowing them to catch micropollutants in the water. After this process runs its course, magnets can be used to gather the nanoparticles along with the contaminants. Theoretically they can be cleaned and reused, which will cut down on waste and cost. Magnetic nanoparticles can and have been prepared safely and sustainably in the lab, the goal of this research is to investigate and improve the the effectiveness of the nanoparticles, building on research of previous years. Different methods of nanoparticle synthesis will be investigated to further optimize surface area and recyclability. With this research, strides in sustainability, cost effectiveness, and efficiency of water treatment will be made.

Student: Ethan Robey
Major: Theatre
Mentor: Janine McCabe
Department: Theatre & Dance

Zero-waste Stage Design: Digitizing the Scenography Process
Development as a theatre artist cannot be fully achieved strictly in a classroom setting. The nature of this collaborative art form requires immersion in realized production work that takes ideas learned in the coursework and puts them into practice - resulting in a far more in-depth understanding. Zero-waste Design: Digitizing the Scenography Process allows
for an intensive look into the day-to-day work and research involved for the Theatrical Designer on a professional theatrical production and applying new digital techniques to what has traditionally been an analog process. Using the creation of an original theatrical design for a producing theatre organization as the framework, this project will allow for the student to gain an understanding of the processes of stage design and to be exposed to professional theatre with high production values. The project requires in-depth analysis of the script, the time period and location of the play, and the logistical challenges unique to each performance space. The student will develop communication and problem-solving skills in a collaborative atmosphere while interacting with the faculty mentor and the members of the production’s creative team - hired by the theatre companies. While the faculty mentor will serve as the lead designer on the production, the student participant will serve as a collaborator and participate in every aspect of the design process and execution of the design, ultimately leading to a portfolio of professional work produced on the stage of this critically acclaimed theatre company.

Student: Molly Rumph
Major: Theatre
Mentor: Janine McCabe
Department: Theatre & Dance

Developing the Costume Design Process
Development as a theatre artist cannot be fully achieved strictly in a classroom setting. The nature of this collaborative art form requires immersion in realized production work that takes ideas communicated in coursework and puts them into practice for an in-depth understanding. “Developing the Costume Design Process” allows for an intensive look and practice in the day-to-day work and research involved for the Costume Designer on theatrical production. Using the creation of original designs for a few productions as the framework, this project will allow for the student to gain an understanding of the processes of theatrical design and to be exposed to professional and academic theatre and opera with high production values. The project requires in-depth analysis of the script and characters for multiple productions, extensive period research, communication and problem-solving techniques in a collaborative atmosphere while interacting with all member of the production’s creative team at the associated theatre and opera companies. While the faculty mentor will serve as the lead designer on the productions, the student participant will collaborate in all stages of the design process and execution of the designs. A major part of the experience and work will be balancing multiple projects at various stages of the design process giving insight to how professional designers make a living in a freelance environment. At the conclusion of this project, the student will have experienced complete immersion as a theatre artist and have high quality professional work at local and regional theatre and opera companies added to her resume and portfolio.

Student: Rebecca Starkey
Major: Geology
Mentor: Walter Scott Persons
Department: Geology

An Investigation into the Fossil Fauna of the Lusk Locality
This project’s goal is to document the fossil fauna of “Lusk”, a site in the badlands of Wyoming. This area is of scientific interest because the rock layers and fossils capture the Late Cretaceous: a period of geologic time that marks the end of the age of dinosaurs. Seventy million-years-ago, the Lusk locality was an open ocean,团队 with fish, ammonoids (shelled realities of modern squid and octopus), and large marine reptiles. A new species of plesiosaur was recently found at this site, suggesting that other forms new to science may be preserved within the marine beds. The project will begin with a week-long trip to the location to dig for new fossils and map the unique rock layers. The nearby Glenrock Paleon Museum (where the faculty mentor is an official curator) also houses several previously excavated fossils that will be photographed, measured, and
digitally scanned for further research. This collection includes the wing of a pterosaur (a flying reptile), the skull of a mosasaur (a giant marine lizard), and partial skeletons of ichthyodectiforms (extinct ray-finned fishes). Select fossils will be transported back to the College of Charleston’s Mace Brown Museum of Natural History to be cleaned and properly preserved. Research time will mainly be focused on identifying specimens found at Lusk and on preparing formal descriptions of the specimens and the geology of the site for journal publication.

Student: Kaitlyn Victoria
Major: Political Science

Mentor: Briana McGinnis
Department: Political Science

Prison Education, Democracy, and Solidarity
This chapter re-frames the practice of offering for-credit college courses in prisons not simply as an instrumental method of reducing recidivism or expanding economic opportunity, but as an expression of democratic solidarity. The literature on the philosophy of punishment deals largely with justifications for punishing. Recent decades have seen a resurgence in varieties of "expressivist" justifications, which posit that public policy accomplishes certain tangible results that can be either desirable or undesirable, but that policy also serves as a method for the society to express its values, sending a message with each policy. We argue that punishment is, indeed, expressive, but that current expressivist theories neglect the messages sent to the people being punished and to the communities to which they belong. If Americans are serious about addressing systemic injustices in the criminal legal system, then all expressive elements of the criminal legal system merit re-evaluation. This paper focuses on one clear opportunity to change the messaging of the criminal legal system to be more reparative and forward-facing. Offering incarcerated people the opportunity to take part in the experience of a college education represents a tangible step toward meaningfully re-integrating returning citizens not only into their political communities of origin but also into the broader society.